Murray

2/104 PCB's DISPOSAL FILE

Your Seattle City Light

Memorandum

DATE : August 15, 1980

TO : Ken Hunich and Walt Sickler

FROM : Peter Willing

SUBJECT : Transformer Disposal Policy

Ken, I am very concerned that some important policy development for PCB disposal seems to have been proceeding without any contribution from Environmental Affairs. I think it is inappropriate that the Distribution, Operations, and Engineering Divisions have begun to develop guidelines, a work program, and schedule for dealing with PCB contamination without consulting Environmental Affairs in the process. I would like to convene a discussion of the problem for Wednesday afternoon, August 20. As a point of departure for the discussion, I would like to outline the following procedure for safe, environmentally responsible handling of the bulk of our transformers, which are those with less than 50 ppm of polychlorinated biphenyl.

changed to Thurs. 8/21

1. A malfunctioning transformer is brought to the repair shop. The oil is drained and pumped to a separate storage tank for waste transformer oil.

2. The transformer is repaired, rebuilt, salvaged or scrapped, and either filled with new certified non-PCB transformer oil or left empty (if salvaged).

3. When the waste transformer oil storage tank is full, the oil is laboratory tested for PCB content. This should verify the assumption that our transformers have less than 50 ppm of PCB, and will indicate the proper disposal method for the oil.

4. If the laboratory tests reveal a concentration greater than 50 ppm, we will have to desire additional procedures for dealing with contaminated oil.

We believe this simple procedure will enable us to continue reusing our transformers with a minimum of PCB analyses, but with assurance that we are operating within the law. It should also obviate the requirement that we respond to transformer oil spills in the same way that we respond to PCB capacitor spills. However, we must also integrate into this policy new requirements under the Resource Conservation and Recovery Act that govern the disposal of waste oil.

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Please give these unsolicited comments some thought before our discussion. For your information, I have attached a summary of a report soon to be released that indicates high levels of PCB and carcinogen-induced abnormalities in a startling percentage of fish and shellfish in the Duwamish River and Elliot Bay.

BR:td
Attachment

cc: Murray
Miller
Recchi
Rockey
Youngs
Willing
Riley
OEA (3)
File

DRAFT

CHEMICAL CONTAMINANTS AND BIOLOGICAL ABNORMALITIES IN CENTRAL AND SOUTHERN PUGET SOUND

by

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Executive Summary

Samples of sediments and bottom-dwelling fish, crabs, shrimp, clams, and worms were collected at quarterly intervals in 1979 from four urban embayments in Puget Sound, Elliott Bay (Seattle), Commencement Bay (Tacoma), Sinclair Inlet (Bremerton), and Budd Inlet (Olympia). Similar sampling was done in two nonurban (reference) areas, Case Inlet and Port Madison.

Sediment samples were analyzed for petroleum hydrocarbons, PCB's, chlorinated pesticides and other chlorinated organic compounds, and metals. The community characteristics (i.e., abundance and species diversity) of the sediment-associated invertebrates and fish were defined; and their tissues were subjected to chemical analyses for the above-mentioned organic compounds and metals.

The highest concentrations of PCB's, chlorinated pesticides, other chlorinated organic compounds, petroleum hydrocarbons, and some metals (e.g., arsenic and lead) in sediments were in samples from the waterways of Commencement Bay, the Duwamish Waterway, Seattle Waterfront, and West Point areas of Elliott Bay, and from Point Herron in Sinclair Inlet. Sediments from reference embayments, Case Inlet and Port Madison, also contained many of these chemicals, but most were present in lower concentrations. Highest concentrations of many of the chlorinated organic compounds, including hexachlorobutadiene, which has been implicated as a carcinogen, were in sediment samples from Commencement Bay.

In contrast to the above-mentioned organic compounds and metals, other toxic metals, such as nickel and chromium, were present in similar concentrations in sediment samples from both reference and urban areas.

Tissue samples generally had organic contaminants which reflected the chemical composition of sediment at the sampling stations from which

the organisms were obtained. As a rule, chlorinated organic compounds were present in higher concentrations in fish and crustacean tissues than in associated sediments. The reverse relationship was generally true for petroleum hydrocarbons. A limited number of biological samples were analyzed; however, petroleum hydrocarbons, PCB's, chlorinated pesticides, hexachlorobenzene, and hexachlorobutadiene were detected in various concentrations in several types of organisms from both urban and nonurban sites. Typically, highest concentrations of these chemicals were found in animals from Elliott and Commencement Bays. The implications of these findings to human health cannot be assessed on the basis of the present findings.

The findings imply that although major differences exist between the concentrations of many contaminants in sediment and biota from nonurban and urban areas, embayments in Puget Sound considerably removed from industrial influences are not free of these contaminants.

In most cases, the same animals from which tissues were taken for chemical analyses were also examined for grossly-visible and microscopic abnormalities. The most severe abnormalities found in fish tissues were liver lesions. The appearance of the eight distinct types of liver lesions, of which two were types of tumors, resembled lesions previously reported in the scientific literature which were induced in laboratory animals (rodents and fish) by toxic chemicals. The fish species most commonly affected were English sole, rock sole, and Pacific tomcod from the most polluted areas within Commencement and Elliott Bays and Sinclair Inlet. Tumor-bearing sole were found only in the following areas of Commencement and Elliott Bays at the indicated average annual frequencies for each species: Elliott Bay's, Duwamish Waterway [English sole, 2.4% (5/210); Pacific tomcod, 3.4% (2/59); and rock sole, 2.1% (3/142)] and

Seattle Waterfront [Rock sole, 1.4% (1/71)] and Commencement Bay's Hylebos Waterway [English sole, 2.3% (3/129) and Pacific tomcod, 2.7% (3/111)] and other waterways (e.g., Sitcum and Blair) [English sole, 2.2% (3/138)], and the southwest portion of Commencement Bay [rock sole, 2.7% (2/79)].

Fish with the other types of liver lesions tended to be more widely distributed in Puget Sound. Focal hepatocellular hyperplasia (an abnormal increase in the number of normal liver cells), for example, was observed in rock sole from most of these areas, at average annual frequencies of 3 to 6%. They were also found in this species obtained from Port Madison (10.0%, 2/20), Case Inlet (4.3%, 1/23), Budd Inlet (3.2%, 2/62), and Sinclair Inlet (2.6%, 1/39).

Shrimp and crabs with six major types of lesions were distributed in Puget Sound in much the same pattern as diseased fish. The most commonly affected organs were the hepatopancreas (equivalent to the vertebrate liver and pancreas) and bladder. Shrimp with necrosis of the hepatopancreas were found in the Hylebos and other Waterways of Commencement Bay at average annual frequencies of 17%, (12/69) and at lower frequencies in Budd (7%, 2/30), Case (7% 3/44) and Sinclair (6%, 3/54) Inlets and along the Seattle Waterfront (6%, 5/9). Crabs with this condition were captured in the same waterways of Commencement Bay (27%, 8/30), the Duwamish Waterway (13%, 4/31), and Case Inlet (9%, 1/11). Necrosis was also observed in the bladders of crabs from the Duwamish Waterway (30%, 9/30), Seattle Waterfront (11%, 1/9), and the Commencement Bay Waterways (27%, 8/30).

Community characteristics of infaunal invertebrates (i.e., invertebrates living within the sediment) were measured in terms of numerical abundance, the Infaunal Trophic Index (a method based on feeding strategies of benthic invertebrates), and species richness (the number of species in a

sediment sample). Of these three indices, species richness values were found to correlate best with concentrations of certain sediment-associated toxic chemicals. Consistently low species richness values were found in sediment samples from the Duwamish Waterway and Budd Inlet.

The characteristics of the fish communities did not appear to reflect the higher levels of pollutants, or prevalence of fish diseases, in certain areas of Elliott and Commencement Bays. Apparently, community characteristics of juvenile and adult fish, such as abundance, species richness and species diversity, were not sufficiently sensitive to measure the effects of environmental perturbations that were evidenced through the other phases of this study.